9.0 Water Quality Standards Review

The Alley Creek and Little Neck Bay Waterbody/Watershed Facility Plan is a component of the New York City Department of Environmental Protection's Combined Sewer Overflow Long-Term Control Plan. This Plan is being prepared in a manner fully consistent with USEPA's CSO Control Policy, the Wet Weather Water Quality Act of 2000 and applicable USEPA guidance.

As noted in Section 1.2 and as stated in the CWA, it is a national goal to achieve "fishable/swimmable" water quality in the nation's waters wherever attainable. The CSO Policy also reflects the CWA's objectives to achieve water quality standards by controlling CSO impacts, but the Policy recognizes the site-specific nature of CSOs and their impacts and provides the necessary flexibility to tailor controls to local situations. The key principles of the CSO Policy were developed to ensure that CSO controls are cost-effective and meet the objectives of the CWA. In doing so, the Policy provides flexibility to municipalities to consider the site-specific nature of CSOs and to determine the most cost-effective means of reducing pollutants and meeting CWA objectives and requirements. The Policy also provides for the review and revision, as appropriate, of water quality standards when developing CSO control plans to reflect the site-specific wet weather impacts of CSOs.

In 2001, USEPA published guidance for coordinating CSO long-term planning with water quality standards reviews. This guidance re-affirmed that USEPA regulations and guidance provide States with the opportunity to adapt their WQS to reflect site-specific conditions related to CSOs. The guidance encouraged the States to define more explicitly their recreational and aquatic life uses and then, if appropriate, modify the criteria accordingly to protect the designated uses.

The Alley Creek and Little Neck Bay Waterbody/Watershed Facility Plan was developed in a manner consistent with the CSO Policy and applicable guidance. Specifically, cost-effectiveness and knee-of-the-curve evaluations were performed for CSO load reduction evaluations using long-term rainfall records. Baseline and Waterbody/Watershed Facility Plan receiving water impact evaluations were performed for average annual rainfall conditions consistent with CSO Policy guidance. The plan resulting from following USEPA regulations and guidance results in substantial benefits. However, it does not fully attain the "fishable/swimmable" goal. When the planning process has this result, the national policy calls for a review and, where appropriate, a revision to water quality standards. The purpose of this section therefore is to address the water quality standards review and revision guidance applicable to the CSO Policy.

9.1 WATER QUALITY STANDARDS REVIEW

9.1.1 Numeric Water Quality Standards

New York State waterbody classifications and numerical criteria which are or may become applicable to Alley Creek and Little Neck Bay are shown in Table 9-1.

Table 9-1. New York State Numeric Surface Water Quality Standards (Saline)

Class	DO (mg/L)	Bacteria (Pathogens)		
		Total Coliform(1) (per 100 mL)	Fecal Coliform(2) (per 100 mL)	Enterococci(3) (per 100 mL)
I	≥4.0	≤10,000	≤2,000	NA
SB, SC	≥4.8(4) ;≥3.0(5)	≤2,400; ≤5,000	≤200	≤35

Notes:

(1) Total coliform criteria are based on monthly geometric means for Class I, and on monthly medians for Classes SB and SC; second criterion for SC and SB is for 80% of samples.

(2) Fecal coliform criteria are based on monthly geometric means.

(3) The enterococci standard is based on a 30-day moving geometric mean per the USEPA Bacteria Rule and applies to the bathing season for SB and SC. The enterococci coastal recreation water infrequent use reference level (upper 95% confidence limit) = 501/100 mL

(4) Chronic standard based on daily average. The DO concentration may fall below 4.8 mg/L for a limited number of days, as defined by the formula:

$$DO_i = \frac{13.0}{2.80 + 1.84e^{-0.1t_i}}$$

where DO_i = DO concentration in mg/L between 3.0 – 4.8 mg/L and t_i = time in days. This equation is applied by dividing the DO range of 3.0 – 4.8 mg/L into a number of equal intervals. DO_i is the lower bound of each interval (i) and t_i is the allowable number of days that the DO concentration can be within that interval. The actual number of days that the measured DO concentration falls within each interval (i) is divided by the allowable number of days that the DO can fall within interval (t_i). The sum of the quotients of all intervals (i …n) cannot exceed 1.0: i.e.,

$$\sum_{i=1}^{n} \frac{t_i\ (actual)}{t_i\ (allowed)} < 1.0$$

(5) Acute standard never less than 3.0 mg/L.

Alley Creek is classified as Class I at present with best usages of secondary contact recreation and fishing. Although this classification and the dissolved oxygen criterion of never-less-than 4.0 mg/L is also considered to be suitable for fish, shellfish and wildlife propagation and survival, a goal of the CWA, the recreational classification of secondary contact is not consistent with the "swimmable" or primary contact use goal. Satisfaction of this goal would require reclassification of Alley Creek to Class SB or SC which are suitable for primary contact recreation. Reclassification of Alley Creek to the fishable/swimmable Class SB/SC requires more stringent numerical coliform bacteria criteria and also changes the minimum daily average dissolved oxygen requirement to 4.8 mg/L(Chronic) from never less than 4.0 mg/L. Little Neck Bay is classified as Class SB with best usages of primary and secondary contact recreation and fishing. Class SB waters shall also be suitable for fish, shellfish and wildlife propagation and survival. The Class SB waterbody classification is fully consistent with the "fishable/swimmable" goals of the CWA.

The Interstate Environmental Commission waterbody classifications applicable to waters within the Interstate Environmental District are shown in Table 9-2. The Upper East River and

its tidal tributaries including Alley Creek and Little Neck Bay are classified as Class A with best intended uses of primary and secondary contact recreation and fish propagation.

Table 9-2. Interstate Environmental Commission Classification, Criteria and Best Uses

Class	Dissolved Oxygen	Best Intended Use
A	≥5.0 mg/L	Suitable for all forms of primary and secondary contact recreation and for fish propagation. In designated areas, they also shall be suitable for shellfish harvesting.
B-1	≥4.0 mg/L	Suitable for fishing and secondary contact recreation. They shall be suitable for the growth and maintenance of fish life and other forms of marine life naturally occurring therein, but may not be suitable for fish propagation.
B-2	≥3.0 mg/L	Suitable for passage of anadromous fish and for the maintenance of fish life in a manner consistent with the criteria established in Sections 1.01 and 1.02 of these regulations.

IEC bacterial standards apply to effluent discharges from municipal and industrial wastewater treatment plants and not to receiving waters.

9.1.2 Narrative Water Quality Standards

The New York State narrative water quality standards which are applicable to Alley Creek and Little Neck Bay and all waterbody classifications are shown in Table 1-2 and restated here in Table 9-3.

Table 9-3. New York State Narrative Water Quality Standards

Parameters	Classes	Standard
Taste-, color-, and odor producing toxic and other deleterious substances	SA, SB, SC, I, SD A, B, C, D	None in amounts that will adversely affect the taste, color or odor thereof, or impair the waters for their best usages.
Turbidity	SA, SB, SC, I, SD A, B, C, D	No increase that will cause a substantial visible contrast to natural conditions.
Suspended, colloidal and settleable solids	SA, SB, SC, I, SD A, B, C, D	None from sewage, industrial wastes or other wastes that will cause deposition or impair the waters for their best usages.
Oil and floating substances	SA, SB, SC, I, SD A, B, C, D	No residue attributable to sewage, industrial wastes or other wastes, nor visible oil film nor globules of grease.
Garbage, cinders, ashes, oils, sludge and other refuse	SA, SB, SC, I, SD A, B, C, D	None in any amounts.
Phosphorus and nitrogen	SA, SB, SC, I, SD A, B, C, D	None in any amounts that will result in growth of algae, weeds and slimes that will impair the waters for their best usages.

It is noted that, in all cases, the narrative water quality standards apply a limit of "no" or "none" and only for selected parameters are these restrictions conditioned on the impairment of waters for their best usages.

The IEC narrative water quality regulations which are applicable to Alley Creek and Little Neck Bay and all waters of the Interstate Environmental District are shown in Table 9-4.

Table 9-4. Interstate Environmental Commission Narrative Regulations

Classes	Regulation
A, B-1, B-2	All waters of the Interstate Environmental District (whether of Class A, Class B, or any subclass thereof) shall be of such quality and condition that they will be free from floating solids, settleable solids, oil, grease, sludge deposits, color or turbidity to the extent that none of the foregoing shall be noticeable in the water or deposited along the shore or on aquatic substrata in quantities detrimental to the natural biota; nor shall any of the foregoing be present in quantities that would render the waters in question unsuitable for use in accordance with their respective classifications.
A, B-1, B-2	No toxic or deleterious substances shall be present, either alone or in combination with other substances, in such concentrations as to be detrimental to fish or inhibit their natural migration or that will be offensive to humans or which would produce offensive tastes or odors or be unhealthful in biota used for human consumption.
A, B-1, B-2	No sewage or other polluting matters shall be discharged or permitted to flow into, or be placed in, or permitted to fall or move into the waters of the District, except in conformity with these regulations.

9.1.3 Attainability of Water Quality Standards

Section 8.2 summarizes water quality modeling analyses which were performed to evaluate attainability of water quality standards under Baseline and WB/WS Facility Plan conditions. The results of these analyses are summarized graphically in Appendix C and in tabular form in Table 9-5 through Table 9-16 for the various numerical criteria for dissolved oxygen and bacteria for current and fishable/swimmable classifications for both Alley Creek and Little Neck Bay.

Attainability of Currently Applicable Standards

Alley Creek

Table 9-5 summarizes the projected summer (June, July, August) percentage attainability of dissolved oxygen for current Class I and IEC Class A criteria for Baseline and WB/WS Facility Plan conditions at the head end, mid-creek and mouth of Alley Creek. For Class I, the WB/WS Facility Plan attainment at the head end is 91 percent and 100 percent attainment at the mouth. The WB/WS Facility Plan attains the IEC Class A criterion approximately 67 to 100 percent of the time during the summer along the length of Alley Creek.

Table 9-5. Summer Attainability of Existing Dissolved Oxygen Criteria for Design Year – Alley Creek

Location	Class I (≥4.0 mg/L) Percent Attainment		IEC Class A (≥5.0 mg/L) Percent Attainment	
	Baseline	WB/WS FP	Baseline	WB/WS FP
Head End	85	91	52	67
Mid-Creek	95	97	77	87
Mouth	100	100	>98	>99

Table 9-6 summarizes the projected percentage annual attainability of total coliform for the Class I secondary contact recreation criterion. As shown, the secondary contact recreation criterion is expected to be fully attained under both Baseline and WB/WS Facility Plan conditions on an annual basis.

Table 9-6. Annual Attainability of Existing Total Coliform Criteria for Design Year – Alley Creek

Location	Class I GM ≤10,000/100 mL Percent Attainment	
	Baseline	WB/WS FP
Head End	100	100
Mid Creek	100	100
Mouth	100	100

Table 9-7 shows similar conditions for fecal coliform. The current Class I secondary contact criterion is expected to be completely attained in Alley Creek annually under both Baseline and WB/WS Facility Plan conditions.

Table 9-7. Annual Attainability of Existing Fecal Coliform Criteria for Design Year – Alley Creek

Location	Class I GM ≤2,000/100 mL Percent Attainment	
	Baseline	WB/WS FP
Head End	100	100
Mid Creek	100	100
Mouth	100	100

Little Neck Bay

Table 9-8 summarizes the projected percentage annual attainability of dissolved oxygen for current Class SB and IEC Class A criteria for Baseline and WB/WS Facility Plan conditions at a number of locations throughout Little Neck Bay: Head of Bay (the confluence with Alley Creek); DMA (near the Douglas Manor Association private beach); Bay Center (near CT station

211); and ER Confluence (the bay's confluence with the East River). As shown, full summer attainment of the dissolved oxygen criteria is projected for all bay stations except at the East River confluence, where 87 percent attainment is expected. The depression of dissolved oxygen in the East River is not CSO related but due to the eutrophication in western Long Island Sound.

Table 9-8. Summer Attainability of Dissolved Oxygen Criteria for Design Year – Little Neck Bay

Location	Class SB, Chronic (see Table 9-1) Percent Attainment		IEC Class A (≥5.0 mg/L) Percent Attainment	
	Baseline	WB/WS FP	Baseline	WB/WS FP
Head of Bay	100	100	99	>99
DMA Beach	100	100	98	98
Bay Center	100	100	>99	>99
ER Confluence	87	87	69	69

Table 9-9 summarizes the projected percentage annual attainability of total coliform for Class SB primary contact recreation criteria. As shown, complete attainment is expected annually throughout Little Neck Bay under both Baseline and WB/WS Facility Plan conditions. Table 9-10 indicates similar results for the Class SB fecal coliform primary contact criterion.

Table 9-9. Annual Attainability of Total Coliform Criteria for Design Year – Little Neck Bay

Location	Class SB/SC Percent Attainment			
	Median ≤2,400/100 mL		80% ≤5,000/100 mL	
	Baseline	WB/WS FP	Baseline	WB/WS FP
Head of Bay	100	100	100	100
DMA Beach	100	100	100	100
Bay Center	100	100	100	100
ER Confluence	100	100	100	100

Table 9-10. Annual Attainability of Fecal Coliform Criteria for Design Year – Little Neck Bay

Location	Class SB/SC GM ≤200/100 mL Percent Attainment	
	Baseline	WB/WS FP
Head of Bay	100	100
DMA Beach	100	100
Bay Center	100	100
ER Confluence	100	100

Table 9-11 summarizes the projected attainability of enterococci criteria which are applicable to Little Neck Bay for primary contact water use. It is noted that the attainment values shown on Table 9-11 are for the three month period of June, July and August as the enterococci criteria were developed specifically for the bathing season. The table shows that the seasonal geometric mean enterococci criterion is expected to be fully attained under both Baseline and WB/WS Facility Plan conditions. Also, the moving average 30-day geometric mean enterococci concentration is expected to be below the criterion of 35 at the private Douglas Manor Association (DMA) Beach. Bay-wide, the infrequent use coastal recreation water reference level (upper 95 percent confidence limit) is attained at a high level. At DMA Beach, the bathing water reference level of 104 is expected to be achieved more than 90 percent of the time during the recreation season under WB/WS Facility Plan conditions.

Table 9-11. Recreation Season Attainability of Enterococci Bacteria for Design Year – Little Neck Bay

Location	Standard 30-Day Moving Geometric Mean ≤35/100 mL		Infrequent Use Reference Level ≤501/100 mL	
	Baseline	WB/WS FP	Baseline	WB/WS FP
Head of Bay	100	100	93	95
DMA Beach(1)	100	100	97	98
Bay Center	100	100	>99	100
ER Confluence	100	100	100	100

(1) For DMA Beach, the moving average 30-day geometric mean <35
For DMA Beach: Baseline <104 is 89 percent; WB/WS FP <104 is 91 percent

Attainability of Potential Future Standards

Alley Creek

NYSDEC considers Class I dissolved oxygen standards supportive of aquatic life uses and consistent with the "fishable" goal of the CWA. Therefore, a standards reclassification would not be necessary for full use attainment in Alley Creek. However, the Class I secondary contact use is not considered consistent with the "swimmable" goal. To revise the classification of Alley Creek to be fully supportive of primary contact uses, it would be necessary to attain the Class SB/SC criteria for total and fecal coliform, and the enterococci criterion and reference level established by USEPA. Table 9-12 through Table 9-16 summarize projected percentage annual and recreation season attainability of these potential criteria.

Table 9-12 presents the annual attainability of Class SB/SC primary contract criteria for total coliform. As shown, the monthly median value is expected to be attained under both Baseline and WB/WS Facility Plan conditions. The attainability of the upper limit criterion is expected to be improved to greater than 75 percent by the WB/WS Facility Plan. Table 9-13 shows monthly attainment during the recreation season, the three summer months of June, July, August which encompasses the official public bathing season at New York City's seven public bathing beaches. The WB/WS Facility Plan achieves attainment of the upper limit criterion for

two of the three summer months during the recreation season. Similar results are evident for fecal coliform as shown in Table 9-14 and Table 9-15: the WB/WS Facility Plan is expected to achieve attainment during the summer months except near the head end, and improves attainment from the Baseline but does not achieve full attainment as determined on an annual basis. It is noted that modeling projects that not even 100 percent elimination of all CSO discharges to Alley Creek would attain the primary contact fecal coliform criterion on an annual basis due to the presence of stormwater discharges.

Table 9-12. Annual Attainability of SB/SC Total Coliform Criteria – Alley Creek

Location	Class SB/SC Percent Attainment			
	Median ≤2,400/100 mL		80% ≤5,000/100 mL	
	Baseline	WB/WS FP	Baseline	WB/WS FP
Head End	100	100	75	92
Mid-Creek	100	100	57	75
Mouth	100	100	92	100

Table 9-13. Recreation Season Attainability of SB/SC Total Coliform Criteria – Alley Creek

Location	Class SB/SC Percent Attainment			
	Median ≤2,400/100 mL		80% ≤5,000/100 mL	
	Baseline	WB/WS FP	Baseline	WB/WS FP
Head End	100	100	100	100
Mid-Creek	100	100	67	67
Mouth	100	100	100	100

Table 9-14. Annual Attainability of SB/SC Fecal Coliform Criteria – Alley Creek

Location	Class SB/SC GM ≤200/100 mL Percent Attainment	
	Baseline	WB/WS FP
Head End	25	50
Mid-Creek	50	75
Mouth	83	100

Table 9-15. Recreation Season Attainability of SB/SC Fecal Coliform Criteria – Alley Creek

Location	Class SB/SC GM ≤200/100 mL Percent Attainment	
	Baseline	WB/WS FP
Head End	67	67
Mid-Creek	67	100
Mouth	100	100

Table 9-16 summarizes the projected attainability of potential enterococci criteria which could be applied to Alley Creek for primary contact water use. The attainment values shown on Table 9-16 are for the three month period of June, July and August. The table shows that 100 percent attainment of the seasonal geometric mean throughout Alley Creek is expected under both Baseline and WB/WS Facility Plan conditions. The infrequent use coastal recreation water reference level (upper 95 percent confidence limit) is not projected to be completely achieved but is attained at a high level, greater than 90 percent of the time. As with fecal coliform, modeling projects that 100 percent elimination of CSO discharges to Alley Creek would not completely attain the infrequent use reference level due to the continuing stormwater discharges.

Table 9-16. Recreation Season Attainability of Enterococci Bacteria for Design Year – Alley Creek

Location	Standard 30-Day Moving Geometric Mean ≤35/100 mL		Infrequent Use Reference Level ≤501/100 mL	
	Baseline	WB/WS FP	Baseline	WB/WS FP
Head End	100	100	94	96
Mid-Creek	100	100	86	91
Mouth	100	100	93	95

9.1.4 Attainment of Narrative Water Quality Standards

Table 9-3 summarizes NYSDEC narrative water quality standards which are applicable to Alley Creek and Little Neck Bay and all waters of the state. The existing CSO discharges to the area and the stormwater discharge some amounts of materials which affect some of the listed parameters to some degree; some amounts of oil and floating substances and floatable materials (refuse) are discharged.

The WB/WS Facility Plan will not completely eliminate, but will greatly reduce, the discharge of these materials to Alley Creek and Little Neck Bay. The Alley Creek CSO Retention Facility, and sewer system and pumping station improvements will reduce the discharge of the parameters of concern by at least 51 percent from Baseline conditions based on volumetric capture. Heavy solids that would settle near the CSO outfalls will be virtually eliminated and floatable materials will be substantially reduced. In addition, floatable materials to Alley Creek will be further retained by the fixed baffling system in the new CSO outfall from the Retention Facility. Consequently, the adverse impacts of the current CSO discharges will be substantially diminished although not completely eliminated as required by the narrative

standards. Additionally, best management practices applied to the separate stormwater discharges also can not completely eliminate impacts from that source but will reduce loadings to the extent feasible.

The WB/WS Facility Plan, although not completely eliminating all of the parameters of concern, will eliminate odors, reduce the deposition of organic solids and floatable materials and restore the aesthetic uses of Alley Creek to the maximum extent practicable.

9.1.5 Water Uses Restored

Fish and Aquatic Life Protection Use

Table 9-5 presents the expected improvements in dissolved oxygen in Alley Creek to be attained by the WB/WS Facility Plan as compared to Baseline conditions for current NYSDEC and IEC dissolved oxygen criteria. The plan is expected to achieve between 91 to 100 percent attainment for the current Class I criterion and 67 to >99 percent attainment with the IEC Class A criterion on a summer basis. The projected area of excursion from the current NYSDEC criterion is projected to be confined mostly to the upper 2,000 ft of Alley Creek. Table 9-8 indicates that 100 percent attainment of the Class SB dissolved oxygen criterion is expected in Little Neck Bay during the summer. This is considered to be a high level of attainment in terms of the protection of fish and aquatic life, most of which spawn during the summer months.

Primary and Secondary Contact Recreation Use

Table 9-6 and Table 9-7 present the expected attainment of current secondary contact recreation criteria in Alley Creek and Table 9-9 through Table 9-11 show projected attainment of current primary contact recreation criteria for Little Neck Bay. As shown, full annual compliance is expected for all bacteriological criteria. In the upper reaches of Little Neck Bay and at DMA Beach, the enterococci reference levels are not completely attained, but are expected to be achieved at a high level.

Table 9-12 through Table 9-16 present the expected attainability of potential Class SB/SC primary contact criteria in Alley Creek. As shown in the tables, complete compliance with primary contact recreation criteria is not projected annually for WB/WS Facility Plan conditions. However, on the basis of the results presented in Table 9-13, Table 9-15, and Table 9-16, it is considered that the WB/WS Facility Plan may achieve a level of bacteriological water quality during the summer recreation period sufficient to satisfy the numerical criteria supportive of primary contact for two of the three summer recreation period months.

Aesthetic Use

As discussed in Section 9.1.4, the WB/WS Facility Plan will not completely eliminate all regulated parameters in the NYSDEC narrative water quality standards to zero discharge levels, but will significantly reduce the volumetric discharge of such substances. Settleable solids will be substantially reduced by the CSO Retention Facility and related improvements. The effect of floatable materials from CSOs will be curtailed by the proposed positive floatables controls and the effect of narrative materials from stormwater inputs will be reduced to the maximum extent

practicable. Accordingly, the aesthetic conditions in Alley Creek should improve to a level consistent with the other attained water uses and the nature of the adjacent shoreline uses.

9.1.6 Practical Considerations

The previous section describes the improvement in the level of summer attainment of the NYSDEC Class I and IEC Class A dissolved oxygen criteria which is expected to result from the WB/WS Facility Plan. As noted, the annual attainment is expected to be very high in Alley Creek and full attainment is expected throughout Little Neck Bay. Modeling shows that not even 100 percent elimination of all CSO discharges would attain the dissolved oxygen criteria at all times due to continuing stormwater discharges.

For the majority of months, complete attainment throughout the project area is expected. In the other months where some limited criterion excursions are expected in the upper reach of Alley Creek and portions of Little Neck Bay, it should be noted that any adverse impact on fish larval propagation may be limited. Fish larvae spawning in Alley Creek will be exchanged with, and transported to, Little Neck Bay waters where dissolved oxygen will be greater. The organisms will therefore not be continuously exposed to Alley Creek dissolved oxygen which may be depressed below the criterion. Consequently, the impact on larval survival will be less than expected based on laboratory studies where organisms are confined and exposed continuously to the same depressed dissolved oxygen level. Because of the significant amount of larval transport which occurs in Alley Creek and Little Neck Bay, and the exposure of the organisms to continuously varying, rather than static, dissolved oxygen concentrations, it is considered to be reasonable to view the ecosystem in its entirety rather than by individual tributary or sub-region for purposes of fish and aquatic life protection.

The area of Alley Creek that does not achieve 100 percent summer compliance with Class I dissolved oxygen criteria is generally the upstream 2000 ft. Since the Creek is relatively narrow and shallow in the headwaters area, this represents a very small percentage of the entire Alley Creek and Little Neck Bay ecosystem. In addition, while the dissolved oxygen is periodically less than 4.0 mg/L, the dissolved oxygen is always greater than 3.0 mg/L. This supports juvenile fish survival and therefore a fish survival use is supported in Alley Creek.

For these reasons, it is considered that, for practical purposes, conditions in Alley Creek and Little Neck Bay would be supportive of the fishable goal of the CWA.

Section 9.1.5 also notes that during the summer recreation season, water quality in Alley Creek may be supportive of numerical criteria for the swimmable (primary contact recreation) goal of the CWA during two of the three summer recreation season months. However, swimming should not be considered as a best use in this waterbody due to periodic overflows from the WB/WS Facility, other regional CSO discharges and continuing stormwater discharges.

9.2 WATER QUALITY STANDARDS REVISION

9.2.1 Overview of Use Attainability and Recommendations

Section 9.1 summarizes the existing and potential water quality standards for Alley Creek and Little Neck Bay and expected levels of attainment based on modeling calculations. For

aquatic life protection, the attainment of the water use can be expected to be greater than that suggested by the attainability of numerical criteria during the summer period due to the limited larval residence time in Alley Creek, organism transport to Little Neck Bay and beyond and the appropriateness of considering the ecosystem, both open waters and tributary, in its entirety rather than as individual components.

For recreational activity, the currently designated uses of secondary contact recreation in Alley Creek and primary contact recreation in Little Neck Bay are expected to be fully attained under WB/WS Facility Plan conditions. Further, numerical water quality conditions suitable to support primary contact may be attained possibly during most of the summer recreation season in Alley Creek for all relevant bacteriological indicators, although bathing and swimming activities would not be considered the best use.

As a result of the water quality conditions and uses expected to be attained in Alley Creek and Little Neck Bay as a result of the WB/WS Facility Plan, it is recommended that the current waterbody classifications, Class I in Alley Creek and Class SB in Little Neck Bay, be retained at this time. The water use goals for the Class I classification in Alley Creek are expected to be achieved, either numerically or for practical purposes, once the WB/WS Facility Plan is constructed and operational except periodically following overflows from the Alley Creek CSO Retention Facility after heavy rainfall events. However, the attainment of the designated uses, while expected, should be demonstrated from long-term post construction water quality monitoring data and numerical modeling.

As noted previously, expected levels of water quality criteria compliance are based on modeling calculations which are subject to some level of uncertainty. In addition, calculations are based on a typical year with an average amount of annual rainfall. Therefore, it is recommended that the actual improvements in water quality conditions resulting from the WB/WS Facility Plan be assessed from the multi-year long-term post construction monitoring program described elsewhere in the WB/WS Facility Plan report. The monitoring program will document the actual attainment of uses: whether the current Class I and Class SB uses are attained as expected; whether other levels of usage are actually achieved supporting a waterbody reclassification, for example, Class SC in Alley Creek; or whether CWA "fishable/swimmable" goals are not attained therefore requiring a Use Attainability Analysis and subsequent water quality standards revision.

As described in this report, modeling calculations indicate that complete attainment throughout the Alley Creek area of some of the Class I water quality criteria and all of the Class SB/SC criteria on a summer basis, both numerical and narrative, would require 100 percent retention of the area CSO discharges. Further, even 100 percent CSO reduction will not achieve the Class I dissolved oxygen criterion during the summer nor potential Class SB/SC fecal coliform criteria annually in Alley Creek due to stormwater discharges to that area. This water quality based effluent limit (WQBEL) of zero annual overflows is not cost-effective nor consistent with the CSO Control Policy. Therefore, until the long-term post-construction monitoring program is completed for Alley Creek and Little Neck Bay to document conditions actually attained, it is recommended that a variance to the WQBEL be applied for, and approved, for the Alley Creek and Little Neck Bay WB/WS Facility Plan for appropriate effluent variables.

9.2.2 NYSDEC Requirements for Variances to Effluent Limitations

The requirements for variances to water quality based effluent limitations are described in Section 702.17 of NYSDEC's Water Quality Regulations. The following is an abbreviated summary of the variance requirements which are considered applicable to Alley Creek and Little Neck Bay. The lettering and numbering are those used in Section 702.17.

(a) The department may grant, to a SPDES permittee, a variance to a water quality-based effluent limitation included in a SPDES permit.

(1) A variance applies only to the permittee identified in such variance and only to the pollutant specified in the variance. A variance does not affect or require the department to modify a corresponding standard or guidance value.

(5) A variance term shall not exceed the term of the SPDES permit. Where the term of the variance is the same as the permit, the variance shall stay in effect until the permit is reissued, modified or revoked.

(b) A variance may be granted if the requester demonstrates that achieving the effluent limitation is not feasible because:

(1) Naturally occurring pollutant concentrations prevent attainment of the standard or guidance value;

(2) Natural, ephemeral, intermittent or low flow conditions or water levels prevent attainment, unless these conditions may be compensated for by the discharge of sufficient volume of effluent to enable the standard or guidance value to be met without violating water conservation requirements.

(3) human-caused conditions or sources of pollution prevent attainment of the standard or guidance value and cannot be remedied or would cause more environmental damage to correct them to leave in place.

(4) Dams, diversions or other types of hydrologic modifications preclude attainment of the standard or guidance value, and it is not feasible to restore the waterbody to its original condition or to operate such modification in a way that would result in such attainment.

(5) Physical conditions related to the natural features of the waterbody, such as the lack of a proper substrate cover, flow, depth, pools, riffles, and the like, unrelated to chemical water quality, preclude attainment of the standard or guidance value; or

(6) Controls more stringent than those required by section 754.1(a)(1) and (2) of this Title would result in substantial and widespread economic and social impact.

(c) In addition to the requirements of subdivision (b) of this section, the requestor shall also characterize, using adequate and sufficient data and principles, any increased risk to human health and the environment associated with granting the variance compared

with attainment of the standard or guidance value absent the variance, and demonstrate to the satisfaction of the department that the risk will not adversely affect the public health, safety and welfare.

(d) The requestor shall submit a written application for a variance to the department. The application shall include:

(1) all relevant information demonstrating that achieving the effluent limitation is not feasible based on subdivision (b) of this section; and

(2) All relevant information demonstrating compliance with the conditions is subdivision (c) of this section.

(e) Where a request for a variance satisfies the requirements of this section, the department shall authorize the variance through the SPDES permit. The variance request shall be available to the public for review during the public notice period for the permit. The permit shall contain all conditions needed to implement the variance. Such conditions shall, at minimum, include:

(1) Compliance with an initial effluent limitation that, at the time the variance is granted represents the level currently achievable by the requestor, and that is no less stringent than that achieved under the previous permit where applicable.

(2) that reasonable progress be made toward achieving the effluent limitations based on the standard or guidance value, including, where reasonable, an effluent limitation more stringent than the initial effluent limitations;

(3) Additional monitoring, biological studies and pollutant minimization measures as deemed necessary by the department.

(4) when the duration of a variance is shorter than the duration of a permit, compliance with an effluent limitation sufficient to meet the underlying standard or guidance value, upon the expiration of the variance; and

(5) A provision that allows the department to reopen and modify the permit for revisions to the variance.

(g) A variance may be renewed, subject to the requirements of this section. As part of any renewal application, the permittee shall again demonstrate that achieving the effluent limitation is not feasible based on the requirements of this section.

(i) The department will make available to the public a list of every variance that has been granted and that remains in effect.

9.2.3 Manner of Compliance with the Variance Requirements

Subdivision (a) authorizes NYSDEC to grant a variance to a "water quality based effluent limitation…included in a SPDES permit." It is understood that the Alley Creek and Little Neck Bay WB/WS Facility Plan, when referenced in the Tallman Island WPCP SPDES permit along with other presumed actions necessary to attain water quality standards, can be interpreted as the equivalent of an "effluent limitation" in accordance with the "alternative effluent control strategies" provision of Section 302(a) of the CWA.

Subdivision (a)(1) indicates that a variance will apply only to a specific permittee, in this case, NYCDEP, and only to the pollutant specified in the variance. It is understood that "pollutant" can be interpreted in the plural, and one application and variance can be used for one or more relevant pollutants. In Alley Creek and Little Neck Bay, a variance would be needed for the following pollutants: oxygen demanding substances (BOD for dissolved oxygen attainability in Alley Creek), and effluent constituents covered by narrative water quality standards (suspended, colloidal and settleable solids; oil and floating substances). A variance for bacteriological criteria would not be requested as the Alley Creek and Little Neck Bay WB/WS Facility Plan is expected to attain Class I and Class SB requirements within the constraints of modeling uncertainty.

Subdivision (b) requires the permittee to demonstrate that achieving the water quality based effluent limitation is not feasible due to a number of factors. It is noted that these factors are the same as those in 40 CFR 131.10(g) which indicate federal requirements for a Use Attainability Analysis. As with the federal regulations, it is assumed that any one of the six factors is justification for the granting of a variance. The Alley Creek and Little Neck Bay Use Attainability Evaluation report in the Appendix documents the applicability of two of the six factors cited in Subdivision (b): (3) human caused conditions and (4) hydrologic modifications.

Subdivision (c) requires the applicant to demonstrate to the department any increased risk to human health associated with granting of the variance compared with attainment of the water quality standards absent the granting of the variance. As noted above, the variance application is needed for suspended, colloidal and settleable solids, and oil and floating substances in the periodic overflows from the Alley Creek CSO Retention Facility. These substances pose no significant risk to human health. Further, as described above in Section 9.1.4, a 51 percent volumetric reduction is expected from Baseline CSO loadings to Alley Creek, with additional capture of floatables from the fixed baffling system in the new outfall. As summarized above in Section 9.1, the Alley Creek and Little Neck Bay WB/WS Facility Plan is expected to achieve the current Class I secondary contact recreation and Class SB primary contact criteria in Alley Creek and Little Neck Bay, respectively. Therefore, no variance is requested for bacteriological conditions. The Alley Creek and Little Neck Bay WB/WS Facility Plan will achieve a relatively high level of attainment of the current Class I DO criterion in Alley Creek, and for the reasons described above in Section 9.1.5 and Section 9.1.6, very limited risk to the environment is expected absent attainment of the standard.

Subdivision (d) of the variance regulations requires that the requestor submit a written application for a variance to NYSDEC which includes all relevant information pertaining to Subdivisions (b) and (c). NYCDEP will submit a variance application for the Alley Creek and Little Neck Bay WB/WS Facility Plan to NYSDEC six months before the plan is placed in

operation. The application will be accompanied by the Alley Creek and Little Neck Bay WB/WS Facility Plan report, the Alley Creek and Little Neck Bay Use Attainability Evaluation, and all other supporting documentation pertaining to Subdivisions (b) and (c) and as required by any other subdivisions of the variance requirements.

Subdivision (e) stipulates that approved variances be authorized through the appropriate SPDES permit, be available to the public for review and contain a number of conditions:

- It is assumed that the initial effluent limitation achievable by the permittee at the time the variance becomes effective, after WB/WS Facility Plan construction, will be based upon the performance characteristics of the WB/WS Facility Plan as agreed upon between NYSDEC and NYCDEP. These interim operational conditions will be based on the WB/WS Facility Plan's design specifications. It is expected that a fact sheet outlining the basis for the WQBEL and interim operational conditions will be appended to the SPDES permits.

- It is assumed that the requirement for demonstration of reasonable progress after construction as required in the permit will include NYCDEP activities such as implementation of the long-term monitoring program and additional waterbody improvement projects as delineated in Section 5 of this WB/WS Facility Plan report. Such actions and projects include: 14 best management practices, the City-wide CSO plan for floatables abatement, other long-term CSO control planning activities which may affect Alley Creek and Little Neck Bay, various East River water quality improvement projects, and various ecosystem restoration activities. These activities are also required under section (3) of the Subdivision.

- It is assumed that the SPDES permits authorizing the Alley Creek and Little Neck Bay WB/WS Facility Plan variance will contain a provision that allows the department to reopen and modify the permit for revisions to the variance.

Subdivision (g) indicates that a variance may be renewed. It is anticipated that a variance for the Alley Creek and Little Neck Bay WB/WS Facility Plan would require renewals to allow for sufficient long-term monitoring to assess the degree of water quality standards compliance. As appropriate, a variance renewal application will be submitted 180 days before SPDES permit expiration.

At the completion of the variance period(s), it is expected that the results of the long-term monitoring program will demonstrate each of the following:

- The degree to which the WB/WS Facility Plan attains the current Class I and Class SB classification water quality criteria and uses;

- The degree to which the WB/WS Facility Plan achieves water quality criteria consistent with the fishable/swimmable goals of the CWA, whether any new cost-effective technology is available to enhance the WB/WS Facility Plan performance, if needed, whether Alley Creek should be reclassified, or whether a Use Attainability Analysis should be approved.

In this manner, the approval of a WQBEL variance for Alley Creek and Little Neck Bay together with an appropriate long-term monitoring program can be considered as a step toward a determination of the following:

- Can Alley Creek be reclassified in a manner which is wholly or partially compatible with the fishable/swimmable goals of the Clean Water Act or

- Is a Use Attainability Analysis needed for Alley Creek and for which water quality criteria?

Although Alley Creek's current waterbody classification, Class I, is not wholly compatible with the goals of the Clean Water Act and would normally require reclassification or a UAA in the State's triennial review obligation, it is considered to be more appropriate to proceed with the more deliberative variance approval/monitoring procedure outlined above. The recommended procedure will determine actual improvements resulting from WB/WS Facility Plan implementation, enable a proper determination for the appropriate waterbody classification for Alley Creek and perhaps avoid unnecessary, repetitive and possibly contradictory rulemaking.

9.2.4 Future Considerations

Urban Tributary Classification

The possibility is recognized that the long-term monitoring program recommended for Alley Creek and Little Neck Bay, and ultimately for other confined waterbodies throughout the City, may indicate that the highest attainable uses are not compatible with the use goals of the Clean Water Act and State Water Quality Regulations. It is therefore recommended that consideration be given to the development of a new waterbody classification in NYSDEC Water Quality Regulations, that being "Urban Tributary."

The Urban Tributary classification would have the following attributes:

- Recognition of wet weather conditions in the designation of uses and water quality criteria.

- Application to urban confined waterbodies which satisfy any of the UAA criteria enumerated in 40CFR131.10(g).

- Definition of required baseline water uses

- Fish and aquatic life survival (if attainable)

- Secondary contact recreation (if attainable)

Other attainable higher uses would be waterbody specific and dependent upon the effectiveness of the site-specific CSO WB/WS Facility Plan /LTCP based upon knee-of-the-curve considerations, technical feasibility and ease of implementation.

The Urban Tributary classification could be implemented through the application of a generic UAA procedure for confined urban waterbodies based on the criteria of 40CFR131.10(g). This procedure could avoid the necessity for repeated UAAs on different waterbodies with similar characteristics. Those waterbodies which comply with the designation criteria can be identified at one time, and the reclassification completed in one rulemaking.

If either of the designated baseline uses of fish and aquatic life survival and secondary contact recreation did not appear to be attainable in a particular setting, then a site-specific UAA would be required.

Narrative Criteria

The recommendation for a WQBEL variance for the Alley Creek and Little Neck Bay WB/WS Facility Plan would apply with regard to the narrative water quality criteria previously cited as well as to the Class I water quality criterion for dissolved oxygen. However, a broad issue remains with the practical ability to attain the requirements of the narrative criteria in situations where wet weather discharges are unavoidable and will occasionally occur after controls. Therefore, it is recommended that NYSDEC review the application of the narrative criteria, provide for a wet weather exclusion with demonstrated need, or make all narrative criteria conditional upon the impairment of waters for their best usage.

Synopsis

Although this WB/WS Facility Plan is expected to result in improvements to the water quality in Alley Creek and Little Neck Bay, it is not expected to completely attain all applicable water quality criteria. As such, the SPDES Permit for the Tallman Island WPCP may require a WQBEL variance for the Alley Creek and Little Neck Bay WB/WS Facility Plan if contravention of some criteria continues to occur. If water quality criteria are demonstrated to be unrealistic after a period of monitoring, NYCDEP would request reclassification of portions of Alley Creek based on a Use Attainability Analysis (UAA). Until the recommended UAAs and required regulatory processes are completed, the current NYSDEC classification of Alley Creek, Class I, and Little Neck Bay, Class SB, should be retained.